Question Paper For Internal Assessment Examination (Theory) - Credit 3 / 88 /

NAME OF STUDY CENTER: SCHOOL OF AERONAUTICS, NEEMRANA

Instructions for Students / Faculty

Mid Term I (Total 60 Marks, 2 HRS. Syllabus from Unit-1)

- Part A: Total number of questions to be given are six (3 from CO1 and 3 from CO2), each carrying 2 marks and are compulsory to attend. There is no choice. They are short answer type questions **(Not More Than 25 Words for Both Question & Answer)**, no objective type or fill in the blanks. Total 12 marks.

- Part B: Total number of questions to be given are six (3 from CO1 and 3 from CO2), out of which student has to answer four (2 from CO1 and 2 from CO2). They are long answer type (**Not More Than 50 Words for Question)**, each carrying 4 marks. Total 16 marks.

- Part C: Total number of questions to be given are six (3 from CO1 and 3 from CO2), out of which student has to answer four (2 from CO1 and 2 from CO2). They are numerical answer type / fully elaborative type (**Not More Than 70 Words For Question)***, each carrying 8 marks. Total 32 marks.

Mid Term II (Total 90 Marks, 2.5 HRS., Syllabus from Unit-2)

- Part A: Total number of questions to be given are ten (5 from CO3 and 5 from CO4), each carrying 3 marks and are compulsory to attend. There is no choice. They are short answer type questions **(Not More Than 25 Words for Both Question & Answer)**, no objective type or fill in the blanks. Total 30 marks

- Part B: Total number of questions to be given are six (3 from CO3 and 3 from CO4), out of which student has to answer four (2 from CO3 and 2 from CO4). They are long answer type (**Not More Than 50 Words for Question)**, each carrying 6 marks. Total 24 marks.

- Part C: Total number of questions to be given are six (3 from CO3 and 3 from CO4), out of which student has to answer any four (2 from CO3 and 2 from CO4). They are numerical answer type / fully elaborative type (**Not More Than 70 Words For Question)***, each carrying 9 marks. Total 36 marks.

Mid Term III (Total 90 Marks, 2.5 HRS., Syllabus from Unit-3)

- Part A: Total number of questions to be given are ten (5 from CO5 and 5 from CO6), each carrying 3 marks and are compulsory to attend. There is no choice. They are short answer type questions **(Not More Than 25 Words for Both Question & Answer)**, no objective type or fill in the blanks. Total 30 marks

- Part B: Total number of questions to be given are six (3 from CO5 and 3 from CO6), out of which student has to answer four (2 from CO5 and 2 from CO6). They are long answer type (**Not More Than 50 Words for Question)**, each carrying 6 marks. Total 24 marks.

- Part C: Total number of questions to be given are six (3 from CO5 and 3 from CO6), out of which student has to answer four (2 from CO5 and 2 from CO6). They are numerical answer type / fully elaborative type (**Not More Than 70 Words For Question)***, each carrying 9 marks. Total 36 marks.

*** LIST OF ELABORATIVE THEORY QUESTION SUBJECTS**: 3 MH4 - 07 Manufacturing Process, 4 AN4 - 06 Aircraft Materials and Processes (Cr 3), 5 AN4 - 05 Aircraft System (Cr 3), 6 AN4 - 05 Avionics-I (Cr 3), 6 MH4 - 03 Applied Hydraulics & Pneumatics (Cr 3), 6 MH5 - 11 Principles of Management (Cr 3), 6 MH5 - 13 Aircraft Electronics System (Cr 3), 7 AN5 - 12 Maintenance of Airframe and System (Cr 3), 7 AN5 - 13 Helicopter Theory (Cr 3), 7 AG6 - 60.1 Human Engineering and Safety (Cr 3), 7 ST - 01 Avionics II (Special Theory Subject) (Cr 3), 7 MH5 - 11 Design of Mechatronics Systems (Cr 3), 7 MH5 - 12 Robotics and Machine Vision System (Cr 3), 7 MH6 - 13 Medical Electronics (Cr 3), 7 AN6 - 60.1 Aircraft Avionic System (Cr 3), 8 AN5 - 12 Maintenance of Power Plant and System

Question Paper For Internal Assessment Examination (Theory) - Credit 3 / 88 /

NAME OF STUDY CENTER: SCHOOL OF AERONAUTICS, NEEMRANA

(Cr 3), 8 AN5 - 13 Unmanned Aerial Vehicles & Systems (UAV) (Cr 3), 8 MH5 - 13 Product Development & Launching (Cr 3), 8 EC6 - 60.2 Robotics and control (Cr 3)

Instructions For Faculties

There should be total 6 Course Outcomes (COs) for each subject.

- Mid Term Question Papers are to be submitted as per Course Outcomes (COs) which should be divided equally in Part A, Part B and Part C according to Mid Term Examination and Credit Point.
- In Mid Term-1, the questions are to be given from CO1 and CO2. In Mid Term-2, the questions are to be given from CO3 and CO4. Similarly, in Mid Term-3, the questions are to be given from CO5 and CO6.
- **FACULTY MEMBERS, PLEASE ENSURE EXCEPT ABOVE LISTED SUBJECTS, NO THEORITICAL ELABORATIVE QUESTION SHOULD BE GIVEN IN PART 'C' OF QUESTION PAPER**

INSTRUCTION FOR STUDENTS

- **STUDENT IS ALLOWED TO ENTER LATE NOT MORE THAN 15 MIN AFTER STARTING OF EXAM,**

QUESTION PAPER & STUDENTS DETAILS

Type of Exam	Mid Term 2	**Date of Submission**	20/03/2021
Name of Faculty	Mr. Rahul Dev Bairwan	**Date of Examination**	22/03/2021
Course	B.Tech (Aeronautical Engineering)	**Semester**	SEMESTER : 8
Batch	Combined Batches 12, 13, 14	**Subject**	8 ME6 - 60.1 Operations Research (Cr 3)-

COURSE OUTCOMES FOR REFERENCE TO FRAME QUESTION PAPERS
(Faculties are required to mention Course Outcome Number against each part of the question paper)

Course Outcome	COURSE OUTCOMES: CO3: Establish the problem formulation by using transportation, assignment models. CO4: Apply sequencing for flow and replacement for maintenance of machines programming, game theory and queuing models.		
Email I'd	rahuldevbairwan@soaneemrana.org	**Phone No.**	945-634-1170
Student Name		**Student Reg No.**	

PART A

All the questions are compulsory to attend.

1. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.	CO 3
Question : 1	Write the aim of Transportation Model.

Question Paper For Internal Assessment Examination (Theory) - Credit 3 / 88 /

NAME OF STUDY CENTER: SCHOOL OF AERONAUTICS, NEEMRANA

8	Transportation Model	Operations Research by Gupta & Heera	
Question : 2	Define a Transportation Problem.		
8	Transportation Model	Operations Research by Gupta & Heera	
Question : 3	Differentiate between transportation problem and assignment problem.		
9	Assignment Model	Operations Research by Gupta & Heera	
Question : 4	Define Travelling salesman problem.		
11	Travelling salesman problem	Operations Research by Gupta & Heera	
Question : 5	Define degeneracy.		
9	Transportation Model	Operations Research by Gupta & Heera	
2. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.			CO 4
Question : 6	Define saddle point.		
22	Game Theory	Operations Research by Gupta & Heera	
Question : 7	Write the conditions where replacement is required.		
16	Replacement Model	Operations Research by Gupta & Heera	
Question : 8	Define basic queuing model.		
19	Queuing theory	Operations Research by Gupta & Heera	
Question : 9	Define decision making under conditions of certainty.		
26	Decision Theory	Operations Research by Gupta & Heera	
Question : 10	Differentiate between pure strategy and mixed strategy.		
23	Game Theory	Operations Research by Gupta & Heera	
PART B			

Question Paper For Internal Assessment Examination (Theory) - Credit 3 / 88 /

NAME OF STUDY CENTER: SCHOOL OF AERONAUTICS, NEEMRANA

FOR MIDTERM 1 - Part B: Total number of questions to be given are six (3 from CO1 and 3 from CO2), out of which student must answer four (2 from CO1 and 2 from CO2).
FOR MIDTERM 2 - Part B: Total number of questions to be given are six (3 from CO3 and 3 from CO4), out of which student must answer four (2 from CO3 and 2 from CO4).
FOR MIDTERM 3 - Part B: Total number of questions to be given are six (3 from CO5 and 3 from CO6), out of which student has to answer four (2 from CO5 and 2 from CO6).

3. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.			CO 3
Question : 1	Explain the characteristics of Transportation Model.		
8	Transportation Model	Operations Research by Gupta & Heera	
Question : 2	Explain Vogel's approximation method and steps involved in its application.		
9	Transportation Model	Operations Research by Gupta & Heera	
Question : 3	A plant manager has four subordinates, and four tasks to be performed. The subordinates differ in efficiency and the tasks differ in their intrinsic difficulty. This estimate of the times each man would take to perform each task is given in the effectiveness matrix attached.. How should the tasks be allocated, one to a man, so as to minimize the total man hours?		
10	Assignment Model	Operations Research by Gupta & Heera	
4. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.			CO 4
Question : 4	Explain money value, present value and depreciation ratio.		
17	Replacement Model	Operations Research by Gupta & Heera	
Question : 5	Write the characteristics of Game Theory.		
22	Game Thoery	Operations Research by Gupta & Heera	
Question : 6	With the help of example, describe in detail decision making under risk.		
27	Decision Theory	Operations Research by Gupta & Heera	
Question : 7 (Old Pattern)			

PART C

Question Paper For Internal Assessment Examination (Theory) - Credit 3 / 88 /

NAME OF STUDY CENTER: SCHOOL OF AERONAUTICS, NEEMRANA

FOR MIDTERM 1 - Part C: Total number of questions to be given are six (3 from CO1 and 3 from CO2), out of which student must answer four (2 from CO1 and 2 from CO2).
FOR MIDTERM 2 - Part C: Total number of questions to be given are six (3 from CO3 and 3 from CO4), out of which student must answer four (2 from CO3 and 2 from CO4).
FOR MIDTERM 3 - Part C: Total number of questions to be given are six (3 from CO5 and 3 from CO6), out of which student has to answer four (2 from CO5 and 2 from CO6).

5. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.			CO 3
Question : 1	Solve the following transportation problem.		
9	Transportation Model	Operations Research by Gupta & Heera	
Question : 2	A dairy plant has five milk tankers I, II, III, IV & V. These milk tankers are to be used on five delivery routes A, B, C, D, and E. The distances (in kms) between dairy plant and the delivery routes are given in the following distance matrix attached. How the milk tankers should be assigned to the chilling centers so as to minimize the distance travelled?		
10	Assignment Model	Operations Research by Gupta & Heera	
Question : 3	A traveler needs to visit all the cities from a list, where distances between all the cities are known and each city should be visited just once. What is the shortest possible route that he visits each city exactly once and returns to the origin city? Also Find the least cost route.		
11	Travelling salesman problem	Operations Research by Gupta & Heera	
6. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.			CO 4
Question : 4	In a self service store with one cashier, 8 customers arrive on an average of every 5 mins. and the cashier can serve 10 in 5 mins. If both arrival and service time are exponentially distributed, then determine a) Average number of customer waiting in the queue for average. b) Expected waiting time in the queue c) What is the probability of having more than 6 customers In the system		
20	Queuing Theory	Operations Research by Gupta & Heera	
Question : 5	A milk plant is considering replacement of a machine whose cost price is Rs. 12,200 and the scrap value Rs. 200. The running (maintenance and operating) costs in Rs. are found from experience to be as follows: Year: 1 2 3 4 5 6 7 8 Running Cost: 200 500 800 1200 1800 2500 3200 4000 When should the machine be replaced?		

Question Paper For Internal Assessment Examination (Theory) - Credit 3 / 88 /

NAME OF STUDY CENTER: SCHOOL OF AERONAUTICS, NEEMRANA

18	Replacement Model	Operations Research by Gupta & Heera	
Question : 6	Solve the game attached.		
24	Game Theory	Operations Research by Gupta & Heera	
Upload Scanned Document In Case of Numerical or Diagram For Any of The Above Questions. *(Mention question number with relevant fig / numerical / equations. Max 150 KB)*			
I have scrutinized the question paper. There is no spelling mistake or any type of irrelevant question.			